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Before the
Federal Communications Commission
Washington, D.C. 20554

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| In the Matter of | ) | |
| | ) | |
| Revision of the Commission's rules | ) | CC Docket No. 94-102 |
| to ensure compatibility with | ) | |
| enhanced 911 emergency calling systems | ) | |
| | ) | |

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**COMMENTS OF KSI INC.**

Charles J. Hinkle, Jr.

KSI Inc.
7630 Little River Trnpike
Suite 212
Annandale, Virginia 22003
(703) 941-5749

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## SUMMARY

KSI Inc. ("KSI"), and its key personnel, since the early 70s, have been recognized as experts and pioneers in the areas of design, development and integration of systems with capabilities for the detection, localization, and tracking of RF, acoustic, and seismic signal sources. With the implementation of cellular services in the 1980s, KSI recognized the public safety utility of employing its direction finding techniques in emergency situations involving cellular communications.

KSI has developed the patented Direction Finding Localization System or "DFLS," which enables the provision of ALI and ANI in a cell-based communications system using angle of arrival (direction finding) techniques to determine the location from which the RF transmissions of a wireless communication originate. DFLS receivers may be located throughout a wireless communications system's service area at strategic sites (for example, cell base station locations) and can identify wireless communications dialed to 911 or other emergency numbers. By employing sophisticated processing of data received concerning the angle of arrival of the RF energy of the 911 communication at multiple sites, the DFLS receiver provides ALI with a level of accuracy sufficient to meet today the proposed five year accuracy standard of the NPRM (as measured by example data collected by KSI from a prototype DFLS system sited at its Annandale, Virginia headquarters).

As set forth below, KSI enthusiastically supports

adoption of the NPRM with the modifications suggested herein. Location technologies capable of meeting and exceeding the requirements for delivering ALI specified in the NPRM exist today. Location finding technologies have been embodied in defense applications for many years. The conversion of these location technologies to public and private sector uses, particularly E-911, will serve many long-established public policy goals of this Commission, of Congress, and of the Administration.

Many members of the public safety community, including NENA and APCO, have already persuasively spoken to the benefits that will be realized by the public safety community from implementation of wireless E-911, including, among them, quicker emergency response and more efficient use of scarce public safety resources. Integration of E-911 capability into wireless CMRS systems will facilitate the deployment of the national Intelligent Transportation System which was established as a national priority by Congress in the Intermodal Surface Transportation Efficiency Act of 1991. ITS deployment, in turn, will enable the CMRS carriers to reap the benefits of commercial revenues from the provision of many new, emerging services. In addition, wireless ALI capability will assist the CMRS carriers in toll fraud detection and location and will enable the carriers to significantly reduce revenues now lost to fraudulent use of their systems.

KSI concurs that all CMRS providers that offer real-time

voice service should be subject to the E-911 requirement. However, KSI further encourages the FCC to extend the requirement to all CMRS systems employing mobile transmitting units regardless of whether they offer voice or data services. KSI believes, moreover, that it is critical for the attainment of effective wireless E-911 service and the fulfillment of the core objective of this proceeding (the establishment of functional equivalence between wireline and wireless E-911 services) that existing subscriber units be provided E-911 capability. There are twenty million of those units today; by the third phase of the E-911 deployment there undoubtedly will be many millions more. Any E-911 deployment that overlooks these subscribers simply will not be effective.

KSI is fully supportive of FCC rules (e.g., required accuracy) that specify performance or functional requirements and agrees that the FCC need not decide what technology is to be used or how any particular technology is to be implemented.

Finally, KSI supports the NPRM's proposal for a three stage, five year phase-in of the E-911 requirement, but suggests certain modifications to the NPRM's plan. These modifications would require the provision of ALI with 150 meter accuracy in the second phase (year 3) and the provision of ALI with 100 meter accuracy in the third phase (year 5).

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| | ) | |
| Revision of the Commission's rules to ensure compatibility with enhanced 911 emergency calling systems | ) | CC Docket No. 94-102 |

**COMMENTS OF KSI INC.**

KSI Inc. ("KSI"), pursuant to Section 1.415 of the Commission's Rules, hereby submits its Comments in response to the Notice of Proposed Rule Making, FCC 94-237 (October 19, 1994) in the above-captioned proceeding.

By its NPRM, the FCC has proposed, inter alia, rules requiring the provision of enhanced 911 ("E-911") services by Commercial Mobile Radio Service ("CMRS") providers. To this end, the Commission has proposed to phase in over five years a requirement that CMRS systems be capable of providing Automatic Location Information ("ALI") in connection with 911 calls, noting its goal of ensuring that "mobile radio service users on the public switched telephone network have the same level of access to 911 emergency services as wireline callers." NPRM at para. 37.

At the outset, KSI commends the FCC and the public safety community for the leadership evidenced in the NPRM on issues critical to the public interest. As set forth below, KSI enthusiastically supports adoption of the NPRM with the modifications suggested herein. Location finding technologies capable of meeting and exceeding the requirements for delivering ALI exist today. Location finding technologies have been embodied

in defense applications for many years. The conversion of these location technologies to public and private sector uses, particularly E-911, will serve many long-established public policy goals of this Commission, of Congress, and of the Administration. The FCC's leadership in spurring the deployment of E-911 in wireless communications systems, moreover, will facilitate the early deployment of a national Intelligent-Vehicle Highway System ("IVHS") consistent with the national priority articulated in the Intermodal Surface Transportation Efficiency Act of 1991 ("ISTEA").[1]

## I. STATEMENT OF INTEREST

### A. KSI

Based in Annandale, Virginia, KSI's personnel, since the early 70s, have been recognized as experts and pioneers in the areas of design, development and integration of systems with capabilities for the detection, localization, and tracking of RF, acoustic, and seismic signal sources. In addition to developing its patented "Direction Finding Localization Systems" or "DFLS" for commercial implementation, KSI provides defense-related (1) specification, design, and development review, (2) performance prediction and validation, and (3) production monitoring, installation, and test planning for major surveillance systems.

KSI daily works hand in hand with major corporations in

[1]IVHS services are now generally referred to in the U.S. as "Intelligent Transportation Systems" or "ITS."

management oversight, concept formulation, technology research, and system design and implementation. KSI's systems analysis procedures are designed to facilitate maximal exploitation of the existence and extraction of information inherent in data. The relevant qualifications and expertise of KSI principals and key employees that have been involved in the development of DFLS are further described in Appendix A to these Comments.

With the implementation of the cellular service in the 1980s, KSI recognized the public safety utility of employing its direction finding techniques in emergency situations involving cellular communications. At the same time, KSI was actively involved in the pioneering stages of analysis and planning of what were to become known as IVHS technologies (generally, the application of advanced information collection, processing and communication for transportation management, for traveler information, and for vehicle control purposes).

KSI was an early member of the Intelligent Vehicle-Highway Society of America ("IVHS AMERICA," now known as "ITS AMERICA"), a utilized Federal Advisory Committee to the U.S. Department of Transportation. KSI recognized from these efforts that application of its direction finding ("DF") techniques to cell-based commercial wireless communications systems could serve many of the goals of the national IVHS program, including improving traffic safety, enhancing mobility, and relieving traffic congestion by enabling the use of existing cellular-equipped vehicles as traffic "probes." KSI, accordingly, has

committed a significant portion of its resources to the development and implementation of DFLS since 1989.

Since that time, KSI has participated in many conferences, expositions, and joint expert meetings (including the E-911 JEM held this past October in Reston, Virginia) concerning the improvement of traffic safety and emergency communications and wireless telephone fraud mitigation. KSI has exhibited DFLS at CTIA toll fraud workshops, at the past three annual meetings of IVHS AMERICA, and will again exhibit DFLS at the upcoming Fifth Annual Meeting of ITS AMERICA in Washington, D.C. in March 1995. KSI's DFLS has been briefed to most of the major wireless service providers and equipment manufacturers in the communications industry over the past several years, and its efforts to promote user and market awareness of DFLS are continuing unabated.[2]

B. DFLS

KSI has developed the patented DFLS, which enables the provision of ALI and ANI in a cell-based communications system using angle of arrival (direction finding) techniques to determine the location from which the RF transmissions of a wireless communication originate. DFLS was one of the location technologies identified by C.J. Driscoll & Associates in their recent survey of such technologies for APCO and the State of California, and was recognized by the Commission in its NPRM (at

[2]Copies of DFLS marketing brochures are attached as Appendix E to these Comments.

paras. 33, 46 and 55).

DFLS receivers may be located throughout a wireless communications system's service area at strategic sites (for example, cell base station locations) and can identify wireless communications dialed to 911 or other emergency numbers. By employing sophisticated processing of data received concerning the angle of arrival of the RF energy of the 911 communication at multiple sites, the DFLS receiver provides ALI with a level of accuracy sufficient to meet today the proposed five year accuracy standard of the NPRM (as measured by example data collected by KSI from a prototype DFLS system sited at its Annandale, Virginia headquarters). DFLS, in addition, also provides wireless Automatic Number Information ("ANI").

DFLS ALI and ANI can be correlated with address and Public Safety databases to help ensure that the nearest PSAP receives all necessary information to respond promptly to the need of the caller for emergency assistance. The technical specifications of DFLS are more fully described in Appendix B to these Comments.[3]

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[3]In its NPRM (at para. 46), the FCC stated that terrestrial radio triangulation methods may be hampered by interference and by signal reflection (multipath). KSI notes that such radio propagation effects are common to the reception of the signal for communications purposes as well, and will typically effect the communications more severely than the direction finding results. In fact, the decade of research conducted by AT&T and others for the development of the current cellular communications configuration found that, although the multipath reflections associated with the typical transmission from a mobile 800 MHz cellular unit routinely produce the Rayleigh fading that manifests

DFLS is a network-based solution to location finding. To this end, DFLS will enable the PSAP to identify the location of any emergency caller in a cell-based wireless system independent of the capabilities and cost of that caller's subscriber equipment. The deployment of DFLS will thus avoid the need for costly retrofitting of existing subscriber equipment, which now totals approximately twenty million 800 MHz cellular phones alone, and will ensure, as the FCC intends, that wireless E-911 is available at the same level as wireline E-911.

KSI's DFLS system has been used in support of counter-crime surveillance and prosecution operations and has significantly impacted the efficiency and costs of those operations. While field testing an experimental development model (XDM), portable, van-based configuration of our DFLS during the closing stage of one recent law enforcement operation, we successfully located the center of the case activities and arrests shortly followed. In just an hour of testing during another operation, DFLS provided the necessary information that enabled

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itself in significant, rapid amplitude fluctuations, the multipath effects typically originate from reflecting surfaces that are within a neighborhood radius of approximately 50 meters around the mobile transmitter. Thus, even where multipath interference may cause such significant signal fading as to impair the intelligibility of the communications, radio triangulation methods can still correctly determine the signal direction of arrival to within the positional resolution of the contributing distribution of reflecting surfaces. KSI's experience with DFLS to date, moreover, indicates that, regardless of overall multipath hampering, DFLS can meet the accuracy requirements proposed by the NPRM.

the closure of a case that had been frustrating resolution for the previous nine months.[4]

Following extensive discussions with the public safety community, KSI has undertaken significant effort over the past year to develop its direction finding techniques in multiple configurations to meet the varying levels of needs of that community. These efforts have led to the development of KSI's Enhanced Direction Finding System ("EDFS"). EDFS, for which KSI has sought a patent, is less equipment-intensive than DFLS and, thus, when deployed is likely to require a lower expenditure. EDFS exploits a single site line-of-bearing ("LOB") which is correlated with other collateral information in the calculation of the location of a mobile communications unit. EDFS is more fully described in Appendix B to these Comments.

During the course of its development of DFLS, KSI has been sensitive to the need to minimize the infrastructure investment required for deployment. KSI's current simplest DFLS configuration will cost less than $30,000 per site. In its current state, KSI estimates that if DFLS capabilities were installed in 200 cell sites in the existing cellular infrastructure in the Washington/Baltimore area, the costs of such DFLS deployment could be fully recaptured in less than a year by a charge of $1.50 per month per subscriber of a single carrier

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[4]KSI notes further that it appears that at least some form of location finding from cellular communications was successfully employed by the Los Angeles Police Department in their location and pursuit of O.J. Simpson.

(approximately 350 thousand subscribers). With further refinement of signal processing and economies achieved by mass production, these costs for even more robust implementations, of course, can be driven significantly lower during the time frame proposed for ALI implementation in the NPRM.

KSI wishes to emphasize to the FCC and the public safety community its commitment to continue to develop both DFLS and EDFS to improve even further the performance of these systems, to refine the accuracy of their derived locations and to lower the costs of their implementation. KSI is confident that the accuracy standards proposed in the NPRM are readily obtainable at a cost that will not unduly burden a CMRS operator's business.

## II. LOCATION TECHNOLOGIES EXIST TODAY CAPABLE OF MEETING THE NPRM's PROPOSED ACCURACY STANDARD

In its NPRM, the FCC requests comment on the technical feasibility of requiring the provision of ALI by CMRS service providers. (NPRM at para. 46). As set forth above, in the attached Appendices and in the Driscoll survey, there, in fact, exist today a number of location technologies, including KSI's DFLS, capable of meeting or exceeding the five year accuracy standard proposed in the NPRM. To this end, although each of these technologies may have advantages and disadvantages (see, generally, Appendix C to these Comments), there can be no doubt that the technology exists today to achieve the implementation of wireless E-911 desired by the Commission. Indeed, various embodiments or portions of those technologies have existed and

been successfully used in defense applications for many years.

Location finding in the wireless context is not magic. It is simply a matter of signal detection, signal processing and data analysis for signal source localization, most of which, of course, are not even unique to location finding. Although these functions may be performed differently among the various available location technologies, each employs some combination of hardware and software, sometimes off-the-shelf, commercially available hardware and software, to derive their locations. Because of the mobility involved in the communication and known RF propagation phenomena, the end result location of mobile telephone stations derived from all of these technologies must, of course, be accepted as an estimate. This, KSI believes, has been recognized fully by the FCC with its proposed accuracy standard and by the public safety community. There are also trade-offs that must be made between infrastructure costs and location accuracy.

For these reasons, KSI strongly urges the FCC to find that the successful implementation of E-911 need not await revolutionary technological advances, but rather is simply a function of deployment of existing technology throughout the communications infrastructure. Deployment will take some time for the manufacturing, integration and installation of the enabling equipment. KSI believes that the five year phase in proposed in

the NPRM is realistic and realizable and aptly addresses these needs.

## III. ADOPTION OF A WIRELESS E-911 REQUIREMENT WILL SERVE THE PUBLIC INTEREST

In the NPRM, the FCC requests comments on the benefits that may be obtained from the implementation of wireless E-911 capability.

### A. PUBLIC SAFETY BENEFITS

Many members of the public safety community, including NENA and APCO, have already persuasively spoken to the benefits that will be realized by the public safety community from implementation of wireless E-911, including, among them, quicker emergency response and more efficient use of scarce public safety resources. Moreover, deployment of a technology like DFLS could further enable better use of motorist assistance resources like tow trucks by providing locations from non-emergency communications to numbers like *77 or #77 in the Washington Metropolitan area or *HELP or other numbers across the nation.

KSI understands that, in the typical case, businesses like the wireless communications providers will base their infrastructure investment decisions on expected returns, and will resist Government-mandated investment. Indeed, KSI believes as discussed below that the investment in E-911 technology in fact will enable the provision of many potentially highly profitable wireless information services associated with ITS deployment. Moreover, since almost thirty percent of new cellular subscribers

now cite safety as their primary motivation for subscribing to cellular service,[5] and the cellular carriers are now marketing their service as safety-related to their subscribers, KSI doubts that the cellular carriers could retain a substantial portion of their existing customer base if they do not implement E-911 or if the customer base was fully informed that E-911 support is not currently available with their facilities. Even if that were not the case, however, KSI believes that the public interest benefits that will be gained in terms of potentially many lives saved, and safer roadways for all motorists, are truly compelling and here fully justify the FCC's proposal.

B. ITS DEPLOYMENT BENEFITS

Beyond even this consideration, in adopting ISTEA, Congress established as a national priority the deployment of an IVHS infrastructure. Since passage of ISTEA, millions of dollars of both public and private sector resources have been expended in pursuing this goal (indeed, KSI believes that the total federal dollars expended on ITS research and development in fiscal year 1995 will actually exceed the FCC's entire budget for the year). The total investment in ITS infrastructure is estimated to exceed $200 Billion over the next 20 years from public and private sector sources.

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[5] "The New Cellular User," Cellular Marketing, December 1993 at 25.

Currently in preparation under the auspices of the U.S. Department of Transportation is the National ITS Program Plan. That Plan, which is expected to be finalized this year, identifies twenty nine user services that are to be provided by the national ITS system architecture. U.S. DOT is also currently conducting Phase II of its national architecture program which will culminate with the identification of a national ITS architecture (expected in 1996) designed to provide the user services identified in the National Program Plan.

Attached as Appendix D to these Comments are excerpts from the three volume Final Draft of the ITS National Program Plan. As shown therein, specifically identified as required user services are "Emergency Management" services, including "Emergency Notification and Personal Security" or "ENPS" and "Emergency Vehicle Management" ("EVM"). ENPS is particularly described as including two capabilities, (1) driver and personal security and (2) automatic collision notification. As noted in the National Program Plan, "[d]river and personal security capabilities provide for user initiated distress signals for incidents like mechanical breakdowns or carjackings. When activated by an incident, automatic collision notification transmits information regarding location, nature, and severity of the crash to emergency personnel." KSI believes that the E-911 capability proposed by the FCC in fact will provide most, if not all, of the capability ultimately required by the ITS ENPS user service.

In addition, E-911 location capability will more generally facilitate the provision of many other ITS user services, including EVM, hazardous materials incident response, traffic control, incident management, route guidance, en-route driver information, and other services. Many of these services will provide salutary public benefits in improving traffic safety, enhancing mobility, and reducing traffic congestion (realizing ultimately an estimated $100 billion annual savings in economic productivity lost to congestion), and even improving environmental quality through reduced emissions (particularly in non-attainment areas). Other of these services, for example, route guidance and en-route traveler information, will enable the provision of commercial services, most likely by the wireless service provider.

KSI will not here even attempt to enumerate all of the expected benefits of the ITS deployment, nor argue the public policy issues underlying that deployment which have already been addressed by Congress, by the States, and by the Administration. KSI does believe, however, that the deployment of E-911 capability in wireless communications systems in fact will directly address the capabilities required by several core ITS user services, and will more generally further and expedite the deployment of an ITS infrastructure throughout the nation. In addition, KSI believes that the E-911 capability likely will enable the wireless communications providers to provide many commercial services in connection with the ITS deployment and ultimately capture revenues

many times that of the investment required to deploy E-911 in their systems.

### C. NATIONAL COMPETITIVENESS BENEFITS

As with many emerging commercial industries, the location field of course is not solely occupied by U.S. interests. Indeed, many private and public sector interests in Europe and the Pacific Rim are addressing their location needs. Many of these interests participated in the first ITS World Congress held in Paris this past December.

In KSI's view, the U.S. is, and has been for many years, the world's leader in the development of localization and tracking technologies. However, because of the need to now convert those technologies from principally defense-oriented use to commercial use the position of leadership in the commercial location arena is tenuous. The spur to investment in that conversion that will be prompted by the adoption of the NPRM will substantially enhance the ability of U.S. interests to retain the U.S. position of leadership in this field, which, in turn, will promote U.S. competitiveness in global markets, will create many high pay, high skilled U.S. jobs and will more generally serve the national defense interests.

### D. TOLL FRAUD MITIGATION

Finally, implementation of location capability within wireless communications systems will enhance the ability of wireless service providers to locate and stop fraudulent use of

their systems. To this end, the FCC has recognized that toll fraud is a significant problem plaguing the cellular industry. Cellular fraud has been estimated to cost over $1 million in fraudulent use each day. Provision of a location capability within the cellular infrastructure, however, will enable the service provider to locate the source of the toll fraud and, working with law enforcement officials, take such action as is possible to mitigate the costs of fraudulent use. Given the magnitude of these losses, the costs incurred in implementing location capability in the cellular networks are likely to be quickly recovered through reduced toll fraud. These savings, in turn, can benefit both carrier and customer alike.

## IV. E-911 CAPABILITY SHOULD BE UBIQUITOUS IN ALL CMRS SYSTEMS AND ALL SUBSCRIBER PHONES

In its NPRM (at para. 38), the FCC proposes to require all CMRS providers that offer access to real-time voice services to integrate E-911 capability into their mobile networks. KSI concurs that all CMRS providers that offer real-time voice service should be subject to the E-911 requirement. However, KSI further encourages the FCC to extend the requirement to all CMRS systems employing mobile transmitters regardless of whether they offer voice or data services. In this respect, KSI notes that certain ITS user services, including the automatic MAYDAY capability of the ENPS service, contemplate principally or exclusively data transmissions, yet the derivation of location appears to be the enabling capability for these services. In addition, KSI notes

the uncertainty over exactly what form new data networks may take and what services they may provide, particularly new narrowband PCS systems, and does not necessarily share the FCC's expectation that these systems will not be involved in emergency communications.[6]

The FCC further has requested comments on what extent implementation of E-911 capability will require subscriber equipment modifications (NPRM at para. 41). KSI believes that the extent of needed subscriber equipment modifications depends largely upon the selection of location technology. Purely network-based location technologies, such as DFLS, do not require any subscriber equipment modification and enable the provision of E-911 services to existing subscriber units.

By contrast, other location technologies, including for example, GPS, that place some, or all, of the location function in the subscriber unit, may require extensive modifications to existing subscriber equipment, or may not provide E-911 capability to those units. These mobile unit solutions rely upon individual customer acceptance to implement a national solution and employ supporting systems, such as GPS, which add increased size, weight, cost and complexity to the subscriber's mobile unit.

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[6]Because of the recent changes in the classification of CMRS and PMRS carriers, KSI believes that it is premature for the FCC to find that the E-911 requirement will not apply to all PMRS systems. For this reason, KSI suggests that the Commission reserve this issue for future consideration.

KSI believes that it is indeed critical for the attainment of effective wireless E-911 service and the fulfillment of the core objective of this proceeding (the establishment of functional equivalence between wireline and wireless E-911 services) that existing subscriber units be provided E-911 capability. There are twenty million of those units today; by the third phase of the E-911 deployment there undoubtedly will be many millions more. Any E-911 deployment that overlooks these subscribers simply will not be effective.

More fundamentally, an uneven E-911 deployment that requires the purchase of special subscriber equipment will establish a dichotomy between those who have better access to emergency public safety services because of their higher income level. Just as purchasers of wireline phones are not offered the choice of whether to buy a phone that may receive E-911 service or not, so should purchasers of wireless phones not have that choice. KSI, accordingly, urges the FCC to adopt rules that require that E-911 capability be offered on a ubiquitous basis to all subscribers of CMRS systems, existing subscribers with older equipment and new subscribers with new equipment alike.

To achieve such ubiquitous service, KSI believes that ultimately a network-based location solution, like DFLS, will prove to be the only viable solution for wireless E-911, one that will be controlled by the network providers and be totally transparent to the user. Another significant advantage of such an approach is the service providers' implementation of the

infrastructures for effecting E-911 and their ability to maintain, improve and control access to the capabilities. If the localization process is the responsibility of the CMRS provider, the provider could control the location and density of the attendant receivers to ensure that receivers were strategically placed (for example, fixed to the side of a building) to ensure coverage is provided in areas with complex reception patterns. E-911 services would be provided equally to all subscribers, independent of the subscriber's equipment, and configuration management over the quality of the service could be controlled.

## V. THE COMMISSION SHOULD ADOPT PERFORMANCE REQUIREMENTS BUT NOT TECHNICAL STANDARDS

In its NPRM (at para. 40) the FCC indicated its intent to adopt performance standards governing the provision of E-911, but not technical standards. KSI concurs with the FCC's approach and wishes to clarify its reply comments in the PCS docket (General Docket No. 90-314) that are cited in paragraph 33 of the NPRM. To this end, KSI is fully supportive of FCC rules (e.g., required accuracy) that specify performance or functional requirements.

KSI further agrees that the FCC need not decide what technology is to be used or how any particular technology is to be implemented. As noted above and in Appendices B and C to these Comments, there now exist multiple competing technologies that will meet the FCC's proposed performance requirements. Still others are under development. There are performance and cost

differences between these technologies. KSI believes that these technologies should be allowed to compete in the marketplace, and that the customers, i.e., the CMRS providers and manufacturers who have the burden of meeting the FCC requirements, should be allowed to decide what technology to use, and how to implement it subject to compliance with the Commission's performance criteria.

With robust competition in the marketplace, in KSI's view, ultimately the wireless communications infrastructure may rely upon more than one location technology to provide E-911 capability. Certain technologies may prove more cost effective in rural areas than urban areas; others may better provide the location capability needed in densely-populated urban canyons. National interoperability for network-based location solutions (those that require no modification to subscriber equipment) will be assured. Mobile unit-based location solutions may encounter interoperability problems across markets if differing solutions are selected by different carriers.

## VI. SUGGESTED MODIFICATIONS TO THE NPRM

KSI suggests the following modifications to the three stage phase-in proposal in the NPRM (at paras. 49-51).

In view of the upgrade in capabilities proposed in NPRM (para. 50) for the second stage of the implementation of E-911 facilities, KSI recommends that the Commission establish a localization accuracy requirement for the locations that are to be provided to the PSAP. Whenever location information is provided

to a using facility such as the PSAP, the location information should include a representation of the accuracy of the positional data that is provided. The accuracy attainable with each individual measurement will vary because the physical parameters (e.g., signal strength) and geometric relations will differ for each measurement. In fact, even the system used to determine any particular location may vary. Thus, the characterization of the uncertainty is essential, for example, to inform the PSAP operator of the degree of accuracy or confidence to associate with the position provided. KSI therefore recommends that the Commission require that, whenever location information is provided to a PSAP for a 911 call, the information shall include a characterization of the associated location uncertainty.

Standard statistical considerations applied in any measurement process show that no measurement is without some uncertainty. In the measurement of a normal, one dimensional statistic with an unbiased estimator, a one-standard-deviation (1-s.d.) interval will have a 68.27% probability of containing the true mean and a two-standard-deviation (2-s.d.) interval will have a 95.45% probability of containing the true mean. With a measure of a normal, two-dimensional statistic, such as the latitude and longitude desired for the localization of a 911 call, there will be an area of uncertainty (AOU) in the shape of an ellipse. This ellipse can be described by its semi-major axis, semi-minor axis, and inclination (of the major axis) relative to North.